

WHAT IS CLAIMED IS:

1. A vaccine composition against feline immunodeficiency virus (FIV), comprising an immunologically effective amount of one or more polynucleotide molecules, wherein each polynucleotide molecule comprises a nucleotide sequence selected from a portion of the genome of an FIV strain, or a nucleotide sequence which is a degenerate variant thereof; and a veterinarily acceptable carrier.

2. The vaccine composition of claim 1, wherein each polynucleotide molecule comprises a nucleotide sequence encoding one or more of a structural or non-structural protein from an FIV strain, or a combination thereof.

3. The vaccine composition of claim 2, wherein the structural protein is selected from the group consisting of the GAG polyprotein, MA, CA, NC, the ENV polyprotein, SU and TM, and the non-structural protein is selected from the group consisting of the POL polyprotein, PR, RT, DU, IN, Rev, Vif and ORF2.

4. The vaccine composition of claim 3, wherein the FIV proteins are selected from the group consisting of GAG, MA, CA, NC, ENV, SU, TM, DU and PR.

5. The vaccine composition of claim 2, wherein the one or more polynucleotide molecules encode a combination of FIV proteins.

6. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules comprise nucleotide sequences encoding at least two different FIV proteins selected from FIV structural and FIV non-structural proteins;

provided that when the one or more polynucleotide molecules encode the ENV and NC proteins from FIV, they also encode at least one other FIV structural or non-structural protein.

7. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules comprise nucleotide sequences encoding at least one FIV structural protein and at least one FIV non-structural protein.

8. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise nucleotide sequences encoding at least four different FIV proteins selected from among the FIV structural and FIV non-structural proteins.

9. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise nucleotide sequences encoding at least five different FIV proteins selected from among the FIV structural and FIV non-structural proteins.

10. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise nucleotide sequences encoding at least six different FIV proteins selected from among the FIV structural and FIV non-structural proteins.

11. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise nucleotide sequences encoding at least seven different FIV proteins selected from among the FIV structural and FIV non-structural proteins.

12. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise a nucleotide sequence encoding at least one FIV structural protein and a nucleotide sequence encoding at least one FIV regulatory protein.

13. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise a nucleotide sequence encoding at least one FIV POL protein and a nucleotide sequence encoding at least one FIV regulatory gene.

14. The vaccine composition of claim 5, wherein the one or more polynucleotide molecules of the vaccine composition comprise a nucleotide sequence encoding at least one FIV structural protein, a nucleotide sequence encoding at least one FIV POL protein, and a nucleotide sequence encoding at least one FIV regulatory protein.

15. The vaccine composition of claim 5, comprising one or more polynucleotide molecules comprising nucleotide sequences encoding a combination of FIV proteins, which combination is selected from the group consisting of GAG/MA/CA/NC; GAG/ENV; GAG/MA/CA/NC/ENV/SU/TM; MA/CA/NC; GAG/MA/NC/DU/PR; and MA/CA/NC/SU/TM.

16. The vaccine composition of claim 5, wherein the nucleotide sequences encoding the combination of FIV proteins are on the same polynucleotide molecule

17. The vaccine composition of claim 2, further comprising a supplemental component selected from the group consisting of an adjuvant, a cytokine, a polynucleotide molecule comprising a nucleotide sequence encoding a cytokine, and an agent to facilitate cellular uptake of polynucleotide molecules by a cat to which the vaccine composition has been administered.

18. The vaccine composition of claim 2, wherein the polynucleotide molecule is DNA.

19. The vaccine composition of claim 18, wherein the DNA is in the form of a plasmid or a viral vector.

20. The vaccine composition of claim 18, wherein the polynucleotide molecule is microencapsulated, or coated onto gold particles.

21. A method of preparing a vaccine composition against feline immunodeficiency virus (FIV), comprising combining an immunologically effective amount of one or more polynucleotide molecules, wherein each polynucleotide molecule comprises a nucleotide sequence selected from a portion of the genome of an FIV strain, or a nucleotide sequence which is a degenerate variant thereof, with a veterinarily acceptable carrier.

22. The method of claim 21, wherein the one or more polynucleotide molecules comprise nucleotide sequences encoding one or more of a structural or non-structural protein from an FIV strain, or a combination thereof.

23. The method of claim 22, wherein the structural protein is selected from the group consisting of the GAG polyprotein, MA, CA, NC, the ENV polyprotein, SU and TM, and the non-structural protein is selected from the group consisting of the POL polyprotein, PR, RT, DU, IN, Rev, Vif and ORF2.

24. The method of claim 21, further comprising adding to the vaccine composition a supplemental component selected from the group consisting of an adjuvant, a cytokine, a polynucleotide

molecule comprising a nucleotide sequence encoding a cytokine, and an agent to facilitate cellular uptake of polynucleotide molecules by a cat to which the vaccine composition has been administered.

25. The method of claim 21, wherein the polynucleotide molecule is DNA.

26. The method of claim 25, wherein the DNA is in the form of a plasmid or a viral vector.

5 27. The method of claim 21, further comprising microencapsulating at least one of the polynucleotide molecules, or coating at least one of the polynucleotide molecules onto gold particles.

28. A method of vaccinating a cat against feline immunodeficiency virus (FIV), comprising administering to the cat the vaccine composition of claim 1.

10 29. The method of claim 28, wherein the vaccine composition is administered parenterally, orally, intranasally, intramuscularly, intradermally, subcutaneously, or by use of gene gun.

30. A kit for vaccinating a cat against feline immunodeficiency virus (FIV), comprising a first container comprising the vaccine composition of claim 1.

31. The kit of claim 30, wherein the vaccine composition is in lyophilized form.

15 32. The kit of claim 31, further comprising a second container comprising a sterile diluent useful to dilute or rehydrate the vaccine composition in the first container.